

1-5 Solving Inequalities

Properties of Order

 $a, b, c \in R$

Addition

If $a > b$, then $a + c > b + c$ If $a < b$, then $a + c < b + c$

Subtraction

If $a > b$, then $a - c > b - c$ If $a < b$, then $a - c < b - c$ $a, b, c \in R$

Multiplication

If $a > b$, and if c is positive, then $a \cdot c > b \cdot c$ If $a < b$, and if c is positive, then $a \cdot c < b \cdot c$ If $a > b$, and if c is negative, then $a \cdot c < b \cdot c$ If $a < b$, and if c is negative, then $a \cdot c > b \cdot c$

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Division

If $a > b$, and if c is positive, then $\frac{a}{c} > \frac{b}{c}$ If $a < b$, and if c is positive, then $\frac{a}{c} < \frac{b}{c}$ If $a > b$, and if c is negative, then $\frac{a}{c} < \frac{b}{c}$ If $a < b$, and if c is negative, then $\frac{a}{c} > \frac{b}{c}$

Examples

ex 1:

$$3(x - 5) < 30$$

 x

$$x - 5 < 10$$

$$x < 15$$

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ex 2:

$$5 - 12y < 65$$

$$\frac{-12y}{-12} < \frac{60}{-12}$$

$$y > -5$$



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ex 3:

$$\left[\frac{3(2-5x)}{4} - 1 \leq 5 - \frac{3(3-2x)}{2} \right]$$

$$3(2-5x) - 4 \leq 20 - 6(3-2x)$$

$$6 - 15x - 4 \leq 20 - 18 + 12x$$

$$-15x + 2 \leq 2 + 12x$$

$$0 \leq 27x$$

$$0 \leq x$$

$$x \geq 0$$



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Notation

set-builder notation $\{x | x \geq 0\}$

interval notation

$+\infty, -\infty$ (open) [closed]

ex 1

$x < 15$ set

$\{x | x < 15\}$

interval

$(-\infty, 15)$

ex 2

$x > -5$

$(-5, +\infty)$

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$$\begin{array}{l} \text{ex 3} \\ x \geq 0 \\ [0, +\infty) \end{array}$$

Homework
p. 37-38
#s 15-43 odd

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